

Theodore Roosevelt National Park, Accuracy Assessment Metadata

Identification_Information:

Citation:

Citation_Information:

Originator:

Remote Sensing and GIS Group, Technical Service Center, US Bureau of Reclamation, Mail Code D-8260, POB 25007, Denver CO 80225

Publication_Date:

2000

Title:

Theodore Roosevelt National Park Accuracy Assessment Data

Geospatial_Data_Presentation_Form:

Table

Series_Information:

Series_Name: USGS-NPS Vegetation Mapping Program

Issue_Identification: Theodore Roosevelt National Park

Publication_Information:

Publication_Place: Denver, CO

Publisher: USGS-BRD

Other_Citation_Details:

Created under contract to the USGS-BRD-CBI

Online_Linkage:

http://biology.usgs.gov/npsveg/thro/index.html#accuracy_assessment_info

Description:

Abstract:

This metadata is for the accuracy assessment data associated with the vegetation land cover and land use geospatial database for Theodore Roosevelt National Park and surrounding areas. The project is authorized as part of the USGS/NPS Vegetation Mapping Program (<http://biology.usgs.gov/npsveg>). The program is being administered by the Biological Resources Division (BRD) of the United States Geological Survey (USGS). The USGS/BRD is responsible for overall management and oversight of all ongoing mapping efforts. This mapping effort was performed by the US Bureau of Reclamation's (USBR) Remote Sensing and GIS Group, Technical Service Center, Denver, CO. The vegetation mapping program is part of a larger Inventory and Monitoring (I&M) program started by the National Park Service (NPS). Their website is : <http://www1.nature.nps.gov/im/>

Purpose:

The purposes of the mapping effort are varied and include the following: Provides support for NPS Resources Management; Promotes vegetation-related research for both NPS and USGS/BRD; Provides support for NPS Planning and Compliance; Adds to the information base for NPS Interpretation; and Assists in NPS Operations. The NPS I&M goals are, among others, to map the vegetation of all national parks and monuments and provide a baseline inventory of vegetation.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998

Currentness_Reference:

From the USGS-NPS Vegetation Mapping Program Theodore Roosevelt National Park, North Dakota Procedure Report, March 7, 2000. See: <http://biology.usgs.gov/npsveg/thro/report.pdf#accuracy>

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None Planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -103.75

East_Bounding_Coordinate: -103.125

North_Bounding_Coordinate: 47.75

South_Bounding_Coordinate: 46.75

Description_of_Geographic_Extent: Theodore Roosevelt NP and surrounding environs

USGS-NPS Vegetation Mapping Program Theodore Roosevelt National Park

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: Land cover
Theme_Keyword: Land use
Theme_Keyword: Vegetation
Theme_Keyword: National Park Service
Theme_Keyword: Accuracy Assessment

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: North Dakota
Place_Keyword: Theodore Roosevelt National Park
Place_Keyword: Little Missouri River
Place_Keyword: Little Missouri National Grasslands
Place_Keyword: Elkhorn Ranch
Place_Keyword: Medora

Taxonomy:

Keywords/Taxon:

Taxonomic_Keyword_Thesaurus: none
Taxonomic_Keywords: vegetation
Taxonomic_Keywords: plants
Taxonomic_Keywords: National Vegetation Classification System

Taxonomic_System:

Classification_System/Authority:

Classification_System_Citation:

Citation_Information:

Originator: Anderson, et al
Publication_Date: 1976
Title: A Land Use and Land Cover Classification System for Use with Remote Sensor Data
Geospatial_Data_Presentation_Form: document
Series_Information:
Series_Name: Geological Survey Professional Paper
Issue_Identification: No. 964
Publication_Information:
Publication_Place: Washington, DC
Publisher: US GPO
Other_Citation_Details: This project used the Level II Land Use Classes
Online_Linkage: <http://biology.usgs.gov/npsveg/classification/index.html>

Taxonomic_Procedures: Sequence of field test data plots, observation plots, and photo-signature observations.

General_Taxonomic_Coverage:

Refer to complete listing of mapped plant alliances/associations under Supplemental Information above.

Taxonomic_Classification:

Taxonomic_Classification:

Taxon_Rank_Name: Kingdom
Taxon_Rank_Value: Plantae

Access_Constraints: None

Use_Constraints:

Acknowledgment of the USGS/BRD, National Park Service, and the USBR/RSGIS Group would be appreciated in products derived from these data. Any person using the information presented here should fully understand the data collection and compilation procedures, as described in the metadata, before beginning analysis. The burden for determining fitness for use lies entirely with the user.

Point_of_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Person: USGS-NPS Vegetation Mapping Program Coordinator
Contact_Organization:

USGS-NPS Vegetation Mapping Program
Theodore Roosevelt National Park

USGS Biological Resources Division, Center for Biological Informatics

Contact_Address:

Address_Type: Physical Address

Address: USGS

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Country: USA

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Address_Type: Mailing Address

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Address: Biological Resources Division, CBI

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Contact_Facsimile_Telephone: 303-202-4219 (org)

Contact_Electronic_Mail_Address: gs-b-npsveg@usgs.gov

Browse_Graphic:

Browse_Graphic_File_Name: <http://biology.usgs.gov/npsveg/thro/images/throaa.jpg>

Browse_Graphic_File_Description: 248 Kbyte

Browse_Graphic_File_Type: JPEG

Data_Set_Credit: Dan Cogan, Doug Crawford, Jean Pennell, Trudy Meyer, Jim Von Loh of Theodore Roosevelt NP, NPS

Native_Data_Set_Environment: UNIX-ARC/INFO

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Overall, initial accuracy of the vegetation map is 74.3% for all vegetation classes and the Kappa Index is 71.3%. Results for each vegetation class are discussed here, and recommendations are made relative to creating a more accurate vegetation map, as desired.

The specific results are presented in Tables 4-2 and 4-3 below. Confidence interval calculations are presented in Appendix O. In general, the percentage of the Park that an individual map class covered is reflected in the number of AA points collected for that type. For example, needle-and-thread herbaceous alliance was interpreted for approximately 33% of the Park and is represented by 28% of the AA points, and the badlands sparse vegetation complex was interpreted for approximately 20% of the Park and is represented by 14% of the AA points. Similarly, the prairie dog town complex was interpreted for approximately 2% of the Park and is represented by 1.7% of the AA points.

However, several map classes are sampled with a larger number of AA points relative to their actual percent abundance/ground cover. For example: the silver buffaloberry shrubland alliance covers 0.1 % of the park and is represented by 2.6% of the AA points; the little bluestem - sideoats grama herbaceous alliance covers 0.3 % and is represented by 3.5% of the AA points; and the prairie sandreed herbaceous alliance covers 0.2 % and is represented by 2.3% of the AA points. Four map classes were not sampled as follows: the ponderosa pine woodland alliance does not occur within Park boundaries and is well-represented by plot and observation data; the quaking aspen woodland alliance has a plot and/or observation form for every stand known to occur in the Park and no additional stands were observed; the emergent wetland class is too small to be interpreted on aerial photos and has an observation form for every wetland observed during field research in the Park; and the Canada thistle herbaceous alliance is too small to be interpreted on aerial photos and has several observation forms reporting occurrences in the Park.

Logical_Consistency_Report: Unknown

Completeness_Report:

AA data, including limited habitat and vegetation data, was recorded on field forms to document the classification decision made by the investigator. All AA data were collected during July 1998. The weather at this time was unusually warm and vegetation readily identifiable except where it was heavily grazed.

AA data were collected as shown in Figure 3-5 with more points collected within extensive types, e.g., AA points were collected proportional to the size of the plant association/map class within the Park. Accuracy assessment of the THRO project area was conducted in January 2000. This involved entering all accuracy data points into a coverage and overlaying these electronically on final vegetation maps (quarter-quads). AA point (identification) numbers plotted alongside each point allowed for comparison with accuracy assessment data forms. A contingency table was set up to record the reference data (collected field data) versus the sample data (vegetation map) for each map unit.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: The UTM coordinates and elevation of all plots were logged using a hand-held Precision Lightweight Global Positioning System (GPS) Receiver (PLGR) unit.

Lineage:

Process_Step:

Process_Description:

AA data were collected as shown in Figure 3-5 with more points collected within extensive types, e.g., AA points were collected proportional to the size of the plant association/map class within the Park. Accuracy assessment of the THRO project area was conducted in January 2000. This involved entering all accuracy data points into a coverage and overlaying these electronically on final vegetation maps (quarter-quads). AA point (identification) numbers plotted alongside each point allowed for comparison with accuracy assessment data forms. A contingency table was set up to record the reference data (collected field data) versus the sample data (vegetation map) for each map unit.

Errors of commission (i.e. user's errors) for each class were calculated by dividing the number of correctly classified samples by the total number of samples that were classified as belonging to that map class. Errors of omission (i.e. producer's errors) for each class were calculated by dividing the number of samples that were classified correctly by the total number of reference samples in that class. Confidence intervals for each map class were calculated using one of the methods shown in Table 3-1, depending on the normality and size of the data.

Overall total accuracy for THRO is calculated across all sampled map classes by dividing the number of correctly classified accuracy points by the total number of accuracy points. Confidence intervals for overall total accuracy were calculated using the equation for normally distributed data (see Table 3-1). A Kappa Index (Foody 1992 in Accuracy Assessment Procedures, TNC, 1994) was used to help account for any correct classification due to chance.

A total of 346 accuracy assessment points were used to assess the THRO vegetation map by:

using AA points collected during the summer of 1998 (front-loading method);

entering AA point coordinates into an electronic format to overlay on the vegetation map;

comparing map vegetation classification (transferred from photo interpretation) with field assessment of vegetation type to determine errors of omission and commission;

resolving questions by referring to original data forms, so that Dr. Butler could make the final determination; and

recording all information on the AA matrix (Table 4-3).

Overall, initial accuracy of the vegetation map is 74.3% for all vegetation classes and the Kappa Index is 71.3%.

The specific results are presented in Tables 4-2 and 4-3 below. Confidence interval calculations are presented in Appendix O. In general, the percentage of the Park that an individual map class covered is reflected in the number of AA points collected for that type. For example, needle-and-thread herbaceous alliance was interpreted for approximately 33% of the Park and is represented by 28% of the AA points, and the badlands sparse vegetation complex was interpreted for approximately 20% of the Park and is represented by 14% of the AA points. Similarly,

the prairie dog town complex was interpreted for approximately 2% of the Park and is represented by 1.7% of the AA points.

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Process_Date: 199909

Methodology:

Methodology_Type: Field

Methodology_Identifier:

Methodology_Keyword_Thesaurus: None

Methodology_Keyword: front-loading

Methodology_Keyword: Kappa Index

Methodology_Description:

The accuracy assessment (AA) for THRO vegetation mapping analyses consisted of preliminary planning and discussion, logistical planning, fieldwork, analysis of fieldwork, and computation of final results. Preliminary planning involved RSGIG and Dr. Jack Butler (Plant Ecologist hired by TNC and responsible for collecting the field AA data). Following detailed discussion, a modified accuracy assessment procedure dubbed "front-loading" (Owens 1998) was selected using protocols outlined in the Accuracy Assessment Procedures (TNC 1994).

The following guidelines for this procedure were adopted at this time:

Observations of vegetation classes were to be ground-based.

Ground sampling techniques were to be similar to the Observation Points collected during initial classification.

The number of samples per plant association/map class would vary depending on abundance of the class upon the landscape.

Logistical planning for the AA revolved around access to work areas within the Park. The actual assessment was begun prior to completion of preliminary vegetation maps for the Park, thus the front-loading aspect of the study.

A maximum number of points to be collected was not assigned, so that the Park could be sampled as completely as possible.

Assessment was performed within Park boundaries and data points were not limited to the previously described gradsects, but rather were located based on availability of access and to a lesser extent, time constraints. Selecting random AA sampling sites beforehand was deemed unnecessary due to familiarity of the principal researcher with vegetation types and distribution at THRO. The final points chosen for assessment were selected to be as representative as possible of the vegetation in the immediate area, well away from stand boundaries, and in a stand larger than the minimum mapping unit (exceptions were made for emergent wetland, scoria and bentonite exposures, and some exotic species classes which rarely exceeded 0.5 hectares in size). Field ecologists were supplied with a vegetation key, to be used to determine plant associations/map classes to enter on the field form. The field form used for the AA was a modified version of the observation point form (Appendix E).

AA data, including limited habitat and vegetation data, was recorded on field forms to document the classification decision made by the investigator. All AA data were collected during July 1998. The weather at this time was unusually warm and vegetation readily identifiable except where it was heavily grazed.

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Theodore Roosevelt National Park

AA data were collected as shown in Figure 3-5 with more points collected within extensive types, e.g., AA points were collected proportional to the size of the plant association/map class within the Park. Accuracy assessment of the THRO project area was conducted in January 2000. This involved entering all accuracy data points into a coverage and overlaying these electronically on final vegetation maps (quarter-quads). AA point (identification) numbers plotted alongside each point allowed for comparison with accuracy assessment data forms. A contingency table was set up to record the reference data (collected field data) versus the sample data (vegetation map) for each map unit.

Methodology_Citation:

Citation_Information:

Originator: Remote Sensing and GIS Group, Technical Service Center, US Bureau of Reclamation, MC-D8260, POB 25007, Denver CO 80225

Publication_Date: 1998

Title:

Accuracy Assessment Procedures,
NBS/NPS Vegetation Mapping Program

Geospatial_Data_Presentation_Form: Report

Publication_Information:

Publication_Place: Denver, Colorado

Publisher: USGS-BRD, Center for Biological Informatics

Other_Citation_Details:

Prepared for:

United States Department of Interior
National Biological Survey and National Park Service

Prepared by:

Environmental Systems Research Institute
380 New York Street
Redlands, California 92373

National Center for Geographic Information and Analysis
University of California
3510 Phelps Hall
Santa Barbara, California 93106

The Nature Conservancy
1815 N. Lynn Street
Arlington, Virginia 22209

Online_Linkage: <http://biology.usgs.gov/npsveg/aa/aa.html>

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Point

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 13

Transverse_Mercator:

Longitude_of_Central_Meridian: -105

Latitude_of_Projection_Origin: 0

False_Easting: 0

False_Northing: 0

Scale_Factor_at_Central_Meridian: .9996

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Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 1

Ordinate_Resolution: 1

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137

Denominator_of_Flattening_Ratio: 298.257

Entity_and_Attribute_Information:

Overview_Description:

Entity_and_Attribute_Overview:

Information collected for Accuracy Assessment included:

Plot Number

Park Code

Date

Observer(s)

Datum

Accuracy

UTM Coordinates: Easting Northing

UTM Zone 9. Offset from Point: Easting (in meters) Northing (in meters)

Topographic Description

Elevation

Aspect

Veg Assoc. at Site

Veg Assoc. 2 within 50m of Site

Veg Assoc. 3 within 50m of Site

Major Species Present (by strata)

Canopy Closure of Top Layer

Rationale for Classification

Comments

Entity_and_Attribute_Detail_Citation:

See:

Accuracy Assessment Field Form:

<http://biology.usgs.gov/npsveg/thro/report.pdf#appendix>

Mapping totals for area and quantity of polygons.

<http://biology.usgs.gov/npsveg/thro/report.pdf#table4-1>

Summary of AA Results for Theodore Roosevelt National Park, by map class.

<http://biology.usgs.gov/npsveg/thro/report.pdf#table4-2>

Contingency table (error matrix) for THRO vegetation mapping accuracy assessment.

http://biology.usgs.gov/npsveg/thro/aa_matrix.pdf

The map codes as described in Appendix K:

<http://biology.usgs.gov/npsveg/thro/codescript.pdf>

Distribution_Information:

Distributor:

Contact_Information:

USGS-NPS Vegetation Mapping Program
Theodore Roosevelt National Park

Contact_Person_Primary:

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Contact_Organization: Center for Biological Informatics, USGS-BRD

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Address_Type: Mailing Address

Address: PO Box 25046, MS-302

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State_or_Province: Colorado

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Contact_Facsimile_Telephone: 303-202-4229

Contact_Facsimile_Telephone: 303-202-4219 (org)

Contact_Electronic_Mail_Address: gs-b-npsveg@usgs.gov

Resource_Description: Badlands National Accuracy Assessment Data

Distribution_Liability:

Although these data have been processed successfully on a computer system at the Biological Resources Division, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly recommended that these data are directly acquired from a Biological Resources Division server, and not indirectly through other sources which may have changed the data in some way. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data. The Biological Resources Division shall not be held liable for improper or incorrect use of the data described and/or contained herein.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Format_Name: HTML

Digital_Transfer_Option:

Online_Option:

Computer_Contact_Information:

Network_Address:

Network_Resource_Name: http://biology.usgs.gov/npsveg/thro/index.html#accuracy_assessment_info

Fees: None

Metadata_Reference_Information:

Metadata_Date: 200001

Metadata_Review_Date: 20060906

Metadata_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: USGS-NPS Vegetation Mapping Program Coordinator

Contact_Address:

Address_Type: mailing and physical address

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U.S. Geological Survey, Center for Biological Informatics, MS 302,

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City: Denver

State_or_Province: Colorado

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Country: USA

Contact_Voice_Telephone: (303) 202-4220

Contact_Facsimile_Telephone: (303) 202-4219

Contact_Electronic_Mail_Address: gs-b-npsveg@usgs.gov

Metadata_Standard_Name: FGDC-STD-001.1-1999 Content Standard for Digital Geospatial Metadata, 1998 Part 1:

USGS-NPS Vegetation Mapping Program
Theodore Roosevelt National Park

Biological Data Profile, 1999

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Extensions:

Online_Linkage: <http://biology.usgs.gov/fgdc.bio/bionwext.txt>

Profile_Name: Biological Data Profile FGDC-STD-001.1-1999